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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,660	11/14/2003	Frank G. Belmonte	37,481	9847
4249	7590	09/28/2007		
CAROL WILSON BP AMERICA INC. MAIL CODE 5 EAST 4101 WINFIELD ROAD WARRENVILLE, IL 60555			EXAMINER OH, TAYLOR V	
			ART UNIT 1625	PAPER NUMBER
			NOTIFICATION DATE 09/28/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Carol.Wilson@bp.com  
Carol.Neth@bp.com  
bppatentus@bp.com

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/713,660		BELMONTE ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Taylor Victor Oh		1625	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 September 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 29 and 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/14/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.

The Status of Claims:

Claims 1-30 are pending.

Claims 1-28 have been rejected.

Claims 29-30 have been withdrawn .

DETAILED ACTION

1. Claims 1-28 are under consideration in this Office Action.

Priority

2. None.

Drawings

3. The drawings filed on 11/14/03 are accepted by the examiner.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the phrase, “at a pressure that is sufficient to maintain the disubstituted benzene, partially oxidized disubstituted benzene, dicarboxylic acid product and solvent as a liquid or solid-liquid slurry” is recited. The specification does not elaborate what is meant by the phrase, “at a pressure that is sufficient to maintain the disubstituted benzene, partially oxidized disubstituted benzene, dicarboxylic acid product and solvent as a liquid or solid-liquid slurry” in the process.

Therefore, an appropriate correction is required.

#### ***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Housley et al (US 2001/0007910) in view of in view of D.M. Lewis et al (US 3,406,196).

Housley et al teaches a process for producing carboxylic acids in the followings as seen from the abstract :

Improved process for producing carboxylic acids or their esters by catalytic liquid phase oxidation of a corresponding precursor in a suitable solvent comprising feeding the reactants to a first oxidation reaction zone at high pressure and high solvent ratio, wherein uptake of oxygen is limited to less than 50% of the oxygen required for full conversion of the precursor to its corresponding carboxylic acid, and then feeding the resulting reaction medium to a second oxidation reaction zone.

a mixture comprising (i) recycled solvent, recycled mother liquor and catalyst, line 11, (ii) reactor condensate from the second reactor, line 12, and (iii) fresh acetic acid make-up, line 13. The mixed feed stream will contain typical catalyst components (e.g., Co, Mn, Br), at generally diluted concentrations from what would normally be present when using a single conventional oxidation reactor. Optionally, but not shown, control of catalyst concentration in the first reaction zone can be achieved by bypassing some of the catalyst-containing mother liquor, line 11, directly to second reactor 20.

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[0033] The paraxylene feed 16 may optionally be pre-mixed with acetic acid solvent and introduced into the system either upstream or downstream of feed pump 14. Optionally, but not shown, a portion of paraxylene feed 16 may bypass reactor 15 and be fed directly to second reactor 20. The reaction medium which results in the first reactor has an acetic acid:paraxylene ratio in the range of from 10-25:1. Best results have been observed when the acetic acid:paraxylene mass ratio is from 10-20:1.

[0036] The feed stream to the first reaction zone, line 10, contains typical oxidation catalyst components (e.g., Co, Mn, Br), but diluted by a factor of about 3 to 5 relative to the catalyst concentration in recycled mother liquor from product recovery, line 11. The catalyst concentration is subsequently raised to more conventional catalyst concentration levels when and as solvent is vaporized and removed overhead in the second reaction zone 20. The total catalyst metals concentration in the first reaction zone will typically lie in the range 200 to 1,000 ppm w/w, whereas the catalyst metals concentration in the second reaction zone will typically lie in the range 600 to 3,000 ppm w/w. When using a Co and Mn metal catalyst system, the total catalyst metals concentration in the first reaction zone should preferably be controlled at greater than about 400 ppm w/w for good catalyst selectivity and activity.

[0037] The oxidation reaction is highly exothermic. Depending on the oxygen uptake and solvent ratio and without a means of cooling the reaction, the heat of reaction could raise the temperature of the first reaction medium to a value higher than the second reactor operating temperature and/or higher than 210° C. A relatively low first reactor exit temperature is desirable to minimize solvent and precursor degradation (i.e., burn) and to eliminate solvent flashing as the pressure of the reaction medium is reduced on entry into the second reaction zone. The first reaction zone may therefore include a cooling coil 18 or employ some other internal or external means for removing heat from the reactor (and reaction medium) to control the exit temperature of the reaction medium below 210° C., and preferably below the second reactor operating temperature. It is impor-

The instant invention, however, differs from the prior art in that 7 to 60 wt percent of the one disubstituted benzene is introduced ; the claimed temperature in the first oxidation stage is at least 5.5 ° F lower than that in the second oxidation stage.



D.M. Lewis et al teaches the oxidation of polyalkyl aromatic to polycarboxylic acid in the following steps (see col. 3 ,lines 40-65) :

(a) oxidizing polyalkyl aromatic compound in a first stage until a major proportion, preferably about from 60 to 100% by weight, of said compound is oxidized to a product in which the polycarboxylic acid obtained by conversion of all the alkyl groups of the compound being oxidized to carboxylic acid groups is present in minor proportion, i.e., less than 50% by weight thereof, and partially oxidized compounds formed by conversion of less than all the alkyl groups of the compound being oxidized to carboxylic acid groups are present in major proportion, i.e., more than 50% by weight thereof, said first-stage oxidation being initiated at a temperature of about from 100 to 225° C., in the presence of 0 to about 15% of water based on the weight of the reaction mass and conducted thereafter at a temperature in said range, in the presence of less than about 50%, and preferably less than about 30%, of water based on the weight of the reaction mass; and

(b) oxidizing said partially oxidized compounds from (a) to said polycarboxylic acid in a second stage, said second-stage oxidation being conducted at a temperature higher, preferably at least about 25° C. higher, than that in (a) and between about 175 and 350° C., the solids content of the reaction mass in (b) being maintained below about 70% by weight by the addition of water thereto.

In addition, when the reaction temperature is sufficiently high , at least 60 % or 95 to 100 % of the polyalkyl aromatic starting compound is converted into the oxidized product (see col. 5 ,lines 11-13). Overall polycarboxylic acid yields, based on polyalkyl aromatic starting compound , of the order of 85 % and 90 % or higher have been demonstrated with great consistency (see col. 9 ,lines 72-75).

Both prior art processes are commonly involved with the oxidation of the substituted aromatic hydrocarbons so as to produce the corresponding carboxylic acids under similar reaction conditions (catalyst composition and reaction temperature).

Housley et al expressly teaches a process for producing carboxylic acids by feeding paraxylene, oxygen, acetic acid, some catalyst in a series of two reactors; D.M. Lewis et al does point out that the high reaction temperature will promote a high conversion to the desired product. Therefore, it would have been obvious to the skilled artisan in the art to be motivated to incorporate the teaching of D.M. Lewis et al into the Housley et al process in order to achieve a high conversion to the desired product.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Andres can be reached on 571-272-0867. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Taylor Victor Oh, MSD,LAC  
Primary Examiner  
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9/21/07